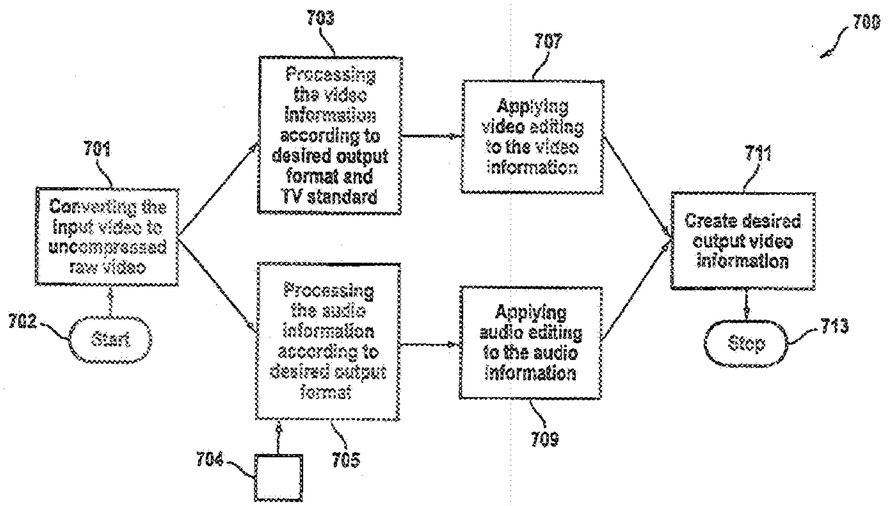
700
701
Converting the input video to uncompressed raw video
702
Start
703
Processing the video information according to desired output format and TV standard
704
705
Processing the audio information according to desired output format
707
Applying video editing to the video information
709
Applying audio editing to the audio information
711
Create desired output video information
713
Stop

FIG. 7

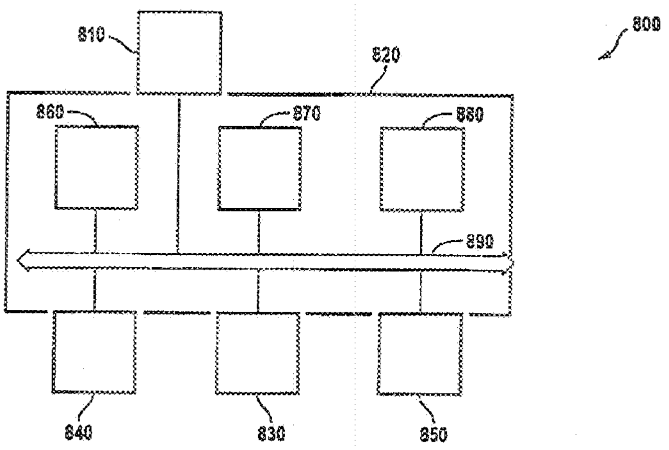
800
810
820
860
870
880
890
840
830
850

FIG. 8

METHOD AND SYSTEM FOR DIRECT RECORDING OF VIDEO INFORMATION ONTO A DISK MEDIUM

CROSS-REFERENCES TO RELATED APPLICATIONS

Not Applicable

STATEMENT AS TO RIGHTS TO INVENTIONS MADE UNDER FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

Not Applicable

REFERENCE TO A "SEQUENCE LISTING," A TABLE, OR A COMPUTER PROGRAM LISTING APPENDIX SUBMITTED ON A COMPACT DISK

Not Applicable

BACKGROUND OF THE INVENTION

The present invention is directed to processing video and audio information. More particularly, the invention provides a method and system for converting video information in an incoming format into an outgoing format, which is one of a plurality of formats using computer software and then writing the video information on a disk medium. But it would be recognized that the invention has a much broader range of applicability. For example, the invention can be applied to a variety of formats and information including audio information for a variety of applications such as fixed files, streaming video, captured streaming video and/or audio, any combination of these, and the like.

From a long time ago, people have been capturing visual images of moving or animated objects for storage and playback. Images were first captured as still on photographic papers, which were organized in stacks and flipped back to illustrate animation. Although somewhat successful, such images could not imitate a continuous and fluid motion of a moving picture. Later on, images were captured on photosensitive films, which were formed on thin plastic rolls. Such rolls were developed, and then played back using a projector, which included a light source that projected images from such roll through a lens onto a display screen. The projector mechanically scrolled through the roll to output images from the roll of film onto the screen to create a moving picture. The roll of film could be stored and later played back at anytime.

Other ways of distributing moving pictures include television. Television broadcasts moving pictures through one of a plurality of channels, which can be selected. Television has been broadcast through wireless ways, as well as hard cables. Moving pictures can also be broadcast or uni-cast from one location to another through a world wide network of computers, commonly called the Internet. Here, the Internet is a world wide "super-network" which connects together millions of individual computer networks and computers. The Internet is generally not a single entity. It is an extremely diffuse and complex system over where no single entity has complete authority or control. Although the Internet is widely know for one of its ways of presenting information through the World Wide Web (herein "Web"), there are many other services currently available based upon the general Internet protocols and infrastructure.

Video can also be transferred and output through the Internet. A company called RealNetworks, Inc. is a provider of media delivery and digital distribution solutions designed for the Internet. RealNetworks, Inc. has provided a way for video streaming media that enable the delivery and playback of multimedia content using a media player. Unfortunately, such media player is often large in size and difficult to download effectively. It often takes minutes to download such media player over a conventional modem device. Complex instructions also accompany the download and later installation of such media player, which makes the media player difficult to use for most Internet users. Accordingly, streaming media has had some success but still lacks wide spread utilization on the Internet. Other video players have also been used. Such video players include, among others, one manufactured and distributed by Microsoft Corporation of Redmond Wash. Others include Quicktime™ by Apple Computers, Inc. Such video players can often output certain video in a proprietary format. Alternative ways of distributing moving pictures includes the use of video tapes, disks (e.g., DVD, CD-ROM), and the like.

Unfortunately, many different types of sources for video now exist. Such sources include video files, captured video, analog video, streaming video, and others. Many different types of video outputs also exist. Such video output types include DVD, VCD, SuperVCD, and others. Accordingly, compatibility problems have plagued conventional video and video/audio technologies. Additionally, difficulties arise in editing video in a first format to a second format since tools have been limited and often require a great deal of technical skill to use such tools, which are cumbersome.

Specifically, conventional techniques have used more than one application to edit and convert video information. Here, multiple software applications are often needed to perform the editing and conversion process. Such applications are often complex and cannot be easily performed without a high degree of skill. Additionally, many of these applications are incompatible with each other further causing difficulty in the editing and converting process. Conventional techniques also take up a large amount of memory (e.g., disk space) and are extremely time consuming. Many other limitations with regard to conventional techniques can be found throughout the present specification and more particularly below.

From the above, it is seen that an improved technique for processing video information is desired.

BRIEF SUMMARY OF THE INVENTION

According to the present invention, techniques for processing video and audio information are included. More particularly, the invention provides a method and system for converting video information in an incoming format into an outgoing format, which is one of a plurality of formats using computer software and then writing the video information on a disk medium. But it would be recognized that the invention has a much broader range of applicability. For example, the invention can be applied to a variety of formats and information including audio information for a variety of applications such as fixed files, streaming video, captured streaming video and/or audio, any combination of these, and the like.

In a specific embodiment, the invention provides a method for converting video information (e.g., captured, streaming, file) from an incoming format to an outgoing format using a single pass conversion process (e.g. continuous) free from one or more intermediary files. The method includes inputting video information in a first format, e.g., captured, streaming, multimedia files. The method directly converts the video information in the first format to raw video information in an uncompressed format, e.g., RGB, YUV. The method inputs a desired output media format based upon a first input and inputs a desired TV standard (check on this) based upon a second input. Preferably, the first and second inputs are user inputs from a user interface. The method directly resizes the raw video information in the uncompressed format into a size associated with the desired output media format and the desired TV standard and also adjusts the uncompressed format in the size associated with the desired output media format and the desired TV standard to a frame rate associated with the desired TV standard. A step of directly processing the uncompressed format in the size and the frame rate into an elementary video stream is included. The method processes (e.g., multiplexes) the elementary video stream with audio information in the desired output media format and the desired TV standard to form video and audio information in a presentation format based upon the desired output media format and the desired TV standard.

In an alternative specific embodiment, the invention provides a system for converting video information from an incoming format to an outgoing format using an integrated computer software application. The integrated computer software application is provided on one or more memories, e.g., hard disk, Read Only Memory, Random Access Memory. A code is directed to receiving video information in a first format. A code is directed to receiving a desired output media format based upon a first input. A code is directed to receiving a desired TV standard based upon a second input. The software application also has a code directed to converting the video information in the first format to raw video information an uncompressed format using a decoding process and a code directed to resizing the raw video information in the uncompressed format into a size associated with the desired output media format and the desired TV standard. The application has a code directed to adjusting the uncompressed format in the size associated with the desired output media format and the desired TV standard to a frame rate associated with the desired TV standard and a code directed to processing the uncompressed format in the size and the frame rate into an elementary video stream. A code is also directed to processing the elementary video stream with audio information in the desired output media format and the desired TV standard to form video and audio information in a presentation format based upon the desired output media format and the desired TV standard. Depending upon the embodiment, there can also be one or more other computer codes for carrying out the functionality described at least throughout the present specification.

In a further alternative embodiment, the invention provides a method for converting video information from an incoming format to an outgoing format using a process free from one or more intermediary files. The method includes receiving video information in a first format and receiving a desired output media format based upon a first input and a desired TV standard based upon a second input. The method decodes the video information in the first format to raw video information in an uncompressed format and directly resizes the raw video information in the uncompressed format into a size associated with the desired output media format and the desired TV standard. The method adjusts the uncompressed format in the size associated with the desired output media format and the desired TV standard to a frame rate associated with the desired TV standard and encodes the uncompressed format in the size and the frame rate into an elementary video stream. A step of multiplexing the elementary video stream with audio information in the desired output media format and the desired TV standard to form video and audio information in a presentation format based upon the desired output media format and the desired TV standard is included.

Many benefits are achieved by way of the present invention over conventional techniques. For example, the present technique provides an easy to use process that relies upon conventional technology. The invention provides an integrated software application, which can be installed on a conventional personal computer or the like. In other embodiments, the invention allows a user to take any video information in any format and convert such video information into an outgoing format for writing onto a disk media, e.g., CD, DVD. Additionally, the invention is easy to use and efficiently processes video and/or audio information in a faster and more efficient way as compared to conventional video/audio editing and conversion applications. Depending upon the embodiment, one or more of these benefits may be achieved. These and other benefits will be described in more throughout the present specification and more particularly below.

Various additional objects, features and advantages of the present invention can be more fully appreciated with reference to the detailed description and accompanying drawings that follow.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a simplified diagram of a conventional video editing and conversion method;

FIG. 2 is a simplified diagram of a digital video processing method according to an embodiment of the present invention;

FIGS. 3A through 3C are more detailed diagrams of video input processes according to embodiments of the present invention;

FIG. 4 is a more detailed diagram of a resizing and adjustment process according to an embodiment of the present invention;

FIG. 5 is a more detailed diagram of a audio adjustment process according to an embodiment of the present invention;

FIG. 6 is a more detailed diagram of a conversion process according to an embodiment of the present invention;

FIG. 7 is a simplified diagram of a video processing method including an editing process according to an embodiment of the present invention; and

FIG. 8 is a simplified diagram of system hardware according to an embodiment of the present invention

DETAILED DESCRIPTION OF THE INVENTION

According to the present invention, techniques for processing video and audio information are included. More particularly, the invention provides a method and system for converting video information in an incoming format into an outgoing format, which is one of a plurality of formats using computer software and then writing the video information on a disk medium. But it would be recognized that the invention has a much broader range of applicability. For example, the invention can be applied to a variety of formats and information including audio information for a variety of applications such as fixed files, streaming video, captured streaming video and/or audio, any combination of these, and the like.

FIG. 1 is a simplified diagram of a conventional method 100 of video editing and conversion. This diagram is merely an example, which should not unduly limit the scope of the claims herein. One of ordinary skill in the art would recognize many other limitations, variations, and modifications. As shown, the method begins with start, step 101, which carries out more than one process often requiring the use of intermediary files, which are often stored in memory. Video information is input, step 102. Here, the video information can be a multi-media file, such as AVI. The method edits, resizes, and adjusts (step 103) the frame rate of the video information. Here, conventional tools such as non-linear video editing software and others are used. The method outputs an intermediary file including the video information with desired size and frame rate 105. The intermediary file is often stored in memory, which takes spaces and is less efficient.

Next, the convention method performs an encoding process, step 107. The encoding process often includes use of conventional tools such as software or hardware encoder and others. The encoding process converts the file with desired size and frame rate to a selected output format, such as MPEG or others. After encoding, the method outputs an elementary video stream 109, which is also in an intermediary file. Such file is often stored.

The conventional method then adds audio information to the elementary video stream in a multiplexing process, step 111. The audio information is in a format such as PCM, MPEG-1, or Dolby Digital formats. Often times, the method uses conventional tools such as disc authoring software to perform the multiplexing process. The conventional method outputs a video/audio file 113 having a desired format. Such file is often stored. The method ends at stop, step 115. As show, the conventional method has many limitations. Depending upon the particular embodiment of the present invention, one or more of these limitations has been overcome by way of the present method and system described throughout the present specification and more particularly below.

A method according to an embodiment of the present invention is provided as follows:

1. Initiate conversion process;
2. Input video information;
3. Convert input video into uncompressed raw video;
4. Transfer uncompressed raw video without any intermediary files;
5. Process raw video to desired output format and TV standard;
6. Process audio information to desired output format;
7. Transfer video and audio in desired formats with any intermediary files;
8. Form desired audio/video output; and
9. Perform other steps, as desired.

As shown, the method performs a sequence of steps to convert video information into a desired format without any intermediary files of conventional techniques. Preferably, the video information can be in almost any format or any format. The output video information can also be in any desired format, depending upon the embodiment. These and other features of the present method can be found throughout the specification and more particularly according to the figures below.

A method according to an alternative embodiment of the present invention is provided as follows:

1. Initiate conversion process;
2. Input video information;
3 Input desired output format from a plurality of formats and input TV standard;
4. Convert input video into uncompressed raw video;
5. Transfer uncompressed raw video without any intermediary files;
6. Process raw video to desired output format and TV standard based upon response from input of desired output format and input of TV standard;
7. Process audio information to desired output format;
8. Transfer video and audio in desired formats with any intermediary files;
9. Form desired audio/video output; and
10. Perform other steps, as desired.

As shown, the method performs a sequence of steps to convert video information into a desired format without any intermediary files of conventional techniques. Preferably, the video information can be in almost any format or any format. The output video information can also be in any desired format, depending upon the embodiment. More preferably, the user selects the desired output format and TV standard using a user interface, e.g., graphical user interface. These and other features of the present method can be found throughout the specification and more particularly according to the figures below.

FIG. 2 is a simplified diagram of a video processing method 200 according to an embodiment of the present invention. This diagram is merely an example, which should not unduly limit the scope of the claims herein. One of ordinary skill in the art would recognize many other limitations, variations, and modifications. As shown, the method begins at start, step 201, where an incoming video information is converted to an outgoing presentation format, which is different from the incoming video information. The method first inputs video information (not shown) from a video source, e.g., analog, digital video, captured video streaming video. The video information can be in almost any format or any format. The method initiates a conversion process of the video information from an incoming format to a raw video format, e.g, uncompressed. The raw video format is often RGB, YUV, or others. Preferably, the conventional process includes a decoding process. The method also separates audio information, if available, from the video information.

The method transfers the raw video raw video without any intermediary files to a resizing and framing process or processes, step 205. Here, the method directly resizes the raw video information in the uncompressed format into a size associated with the desired output media format and the desired TV standard. The method also directly adjusts the uncompressed format in the size associated with the desired output media format and the desired TV standard to a frame rate associated with the desired TV standard. The method processes the uncompressed format in the size and the frame rate into an elementary video stream. The method also processes the audio information (step 207) into a desired output format. Preferably, the method uses one or more encoding processes. The encoding process can form a desired output such as DVD, VCD, and others.

Next, the method transfers the video and audio information in desired formats without any intermediary files in preferred embodiments. The method forms the desired audio/video output (step 209) using at least a multiplexing process, which combines audio and video information together. The method stops at step 211. Preferably, the method inputs (step 215) video format information based